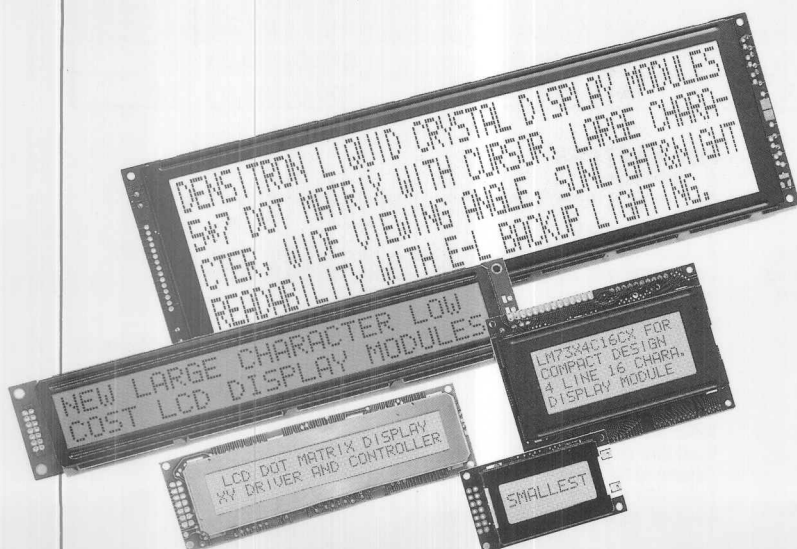


DENSITRON

DENSITRON DOT MATRIX LCD CHARACTER DISPLAYS



CHARACTER

SUPERTWIST/ TWISTED NEMATIC LCD MODULES

(WITH EL BACKLIGHT OPTION)

Display Format	Module Number	Character Height (mm)	High Contrast Option	Duty Cycle	Effective Viewing Area W x H (mm)	Overall Size W x H x D (mm)
1 x 8	LM65	4.45	STN	1/8	35.0 x 15.0	58.0 x 32.0 x 12.0
1 x 16	LM12	5.55	STN	1/11	63.5 x 15.8	85.0 x 36.0 x 12.0
1 x 16	LM71	7.95	STN	1/16	99.0 x 13.0	115.0 x 35.0 x 10.0
1 x 16	LM2012	5.5	NTN	1/11	63.5 x 15.8	85.0 x 36.0 x 9.6
1 x 16	LM2015	5.20	NTN	1/8	64.5 x 13.8	80.0 x 36.0 x 11.0
1 x 16	LM2020	5.20	NTN	1/16	64.5 x 13.8	80.0 x 36.0 x 11.0
1 x 24	LM13	5.55	STN	1/11	93.5 x 15.8	118.0 x 36.0 x 13.0
1 x 40	LM14	5.55	STN	1/11	154.4 x 15.8	182.0 x 33.5 x 13.0
2 x 8	LM70	3.80	STN	1/16	35.0 x 15.0	58.0 x 32.0 x 12.0
2 x 12	LM2212	4.95	NTN	1/10	45.2 x 15.5	55.7 x 32.0 x 10.5
2 x 16	LM22	4.51	STN	1/16	63.5 x 15.8	85.0 x 36.0 x 12.0
2 x 16	LM66	4.85	STN	1/16	61.0 x 15.8	84.0 x 44.0 x 15.0
2 x 16	LM2000	3.20	NTN	1/16	64.5 x 13.8	80.0 x 36.0 x 11.0
2 x 16	LM2016	4.80	NTN	1/16	61.0 x 16.0	84.0 x 44.0 x 11.0
2 x 16	LM2022	4.80	NTN	1/16	63.5 x 15.8	85.0 x 36.0 x 10.3
2 x 16	LM2162	5.95	NTN	1/16	62.0 x 16.0	85.0 x 30.0 x 9.0
2 x 20	LM69	5.55	STN	1/16	83.0 x 18.6	116.0 x 37.0 x 13.0
2 x 20	LM2215	4.80	NTN	1/16	82.8 x 18.5	116.2 x 44.2 x 11.0
2 x 24	LM23	4.51	STN	1/16	93.5 x 15.8	118.0 x 36.0 x 13.0
2 x 24	LM2227	4.80	NTN	1/16	93.5 x 15.8	118.0 x 36.0 x 11.0
2 x 40	LM24	4.51	STN	1/16	154.5 x 15.8	182.0 x 33.5 x 13.0
2 x 40	LM2218	4.80	NTN	1/16	152.2 x 16.5	182.0 x 33.6 x 11.2
2 x 40	LM2402	4.01	NTN	1/16	130.8 x 13.2	149.4 x 27.0 x 14.6
4 x 16	LM73	4.15	STN	1/16	61.8 x 25.2	87.0 x 60.0 x 14.0
4 x 16	LM2433	4.15	NTN	1/16	61.8 x 25.2	87.0 x 60.0 x 11.0
4 x 20	LM2043	3.51	NTN	1/16	58.6 x 21.1	77.0 x 47.0 x 11.5
4 x 20	LM2434	4.15	NTN	1/16	76.0 x 25.25	98.8 x 60.2 x 11.0
4 x 40	LM44	4.85	STN	1/16	160.0 x 34.0	215.0 x 60.0 x 17.5
4 x 40	LM2457	4.27	NTN	1/16	147.0 x 29.5	190.0 x 54.0 x 11.0

FLUID OPTIONS

All formats are available with either standard Twisted Nematic (TN) fluid or high contrast, Super Twisted Nematic (STN) and New Twisted Nematic (NTN) fluids.

TN fluid is available with several options. Bottom view - where the viewing cone is biased towards the 6 o'clock position, Top view - where the viewing cone is biased towards the 12 o'clock position. Both viewing cone options are also available with wide temperature fluid enabling operation from -20°C to +70°C.

STN or NTN high contrast fluids offer the user the benefits of wider viewing angle (approx. 60°) and a high contrast display.

These high contrast fluids are available in three modes:-

Yellow Mode - Yellow/Green background, black dot. Reflective and transmissive options available.

Grey Mode - Grey background, dark blue dot. Reflective and transmissive options available.

Blue Mode - Dark blue background, light blue dot. Transmissive only.

POLARISER TYPES

A - Reflective

No backlight fitted. Suitable for use in high ambient light conditions.

B - Transflective

EL backlight fitted. Suitable for use in both high and low ambient light conditions with EL lamp activated. Display has black dot on light background.

E - Transmissive

EL backlight fitted. Suitable for office and low ambient light conditions, lit dot on a dark background.

TEMPERATURE

Standard range TN, STN, NTN 0°C to +50°C

Extended range TN -20°C to +70°C

Extended range NTN available on selected LM2000 Series Modules.

Contact local sales office for details.

MECHANICAL DIMENSIONS

Display Format	Module Number	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	Pin Pos ★
1 x 8	LM65	58	53	2.54	45	26.8	35	4.1	11.5	32	27	2.5	28.6	6	5	13.5	15	18.5	12	2	4.7	02.5	PP2
1 x 16	LM12	85	80	2.5	73.5	59.4	63.5	1.05	13.25	36	31	2.5	28	7.88	8.7	11.85	15.8	10.1	12	1.6	4.7	02.5	PP2
1 x 16	LM71	115	110	2.5	107.5	94.9	99	2.1	8	35	30	2.5	25	10	7.95	13.5	13	11	10	1.6	4.7	02.5	PP1
1 x 16	LM2012	85	80	2.5	73.5	59.4	63.5	1.05	13.25	36	31	2.5	28	7.8	8.7	11.8	15.8	10.1	12	1.6	4.7	02.5	PP2
1 x 16	LM2015	80	75	2.5	71.5	59.45	64.5	2.5	8.35	36	31	2.5	27	NA	5.95	15.3	13.8	11.1	11	1.6	5.5	02.5	PP1
1 x 16	LM2020	80	75	2.5	71.5	59.45	63.5	2.5	7.75	36	31	2.5	27	NA	5.95	15.3	13.8	11.1	11	1.6	5.5	02.5	PP1
1 x 24	LM13	118	113	2.5	108.5	89.4	93.5	1.02	15	36	31	2.5	28.6	7.88	8.7	13.65	15.8	10.1	13.0	1.6	4.7	02.5	PP2
1 x 40	LM14	182	175	3.5	164.5	149.4	154.5	2.85	NA	33.5	26.5	3.5	32.5	7.0	8.7	NA	15.8	8.5	13	1.6	4.7	03.5	PP2
2 x 8	LM70	58	53	2.5	45	25.6	35	4.7	11.5	32	27	2.5	28.6	6	9.6	11.2	15	8.5	12	1.6	4.7	02.5	PP2
2 x 12	LM2212	55.7	31.2	12.25	52.3	45.2	46.7	0.75	4.5	32.0	30.0	-	25.0	-	11.7	-	17.5	7.25	10.5	1.6	5.5	-	PP7
2 x 16	LM22	85	80	2.5	73.5	59.4	63.5	2.05	13.25	36	31	2.5	28.5	7.88	12.3	11.85	15.8	10.1	12	1.6	4.7	02.5	PP2
2 x 16	LM66	84	76	4	75	56.2	61	2.4	11.5	44	36	4.0	34.5	8.2	11.5	14.75	16.0	12.6	15	1.6	5.8	02.5	PP3
2 x 16	LM2000	80	75	2.5	71.5	57.7	64.5	3.4	9.3	36	31	2.5	27	NA	9.4	11.4	13.8	8.9	11	1.6	4.6	02.5	PP1
2 x 16	LM2016	84	76	4	71.5	56.2	61	2.4	11.5	44	36	4.0	34.5	4	11.5	14.75	16	12.5	11	1.6	5.7	02.5	PP3
2 x 16	LM2022	85	80	2.5	71.5	56.2	63.5	3.65	13.25	36	31	2.5	31.5	7.88	11.5	12.25	15.8	10.1	10.3	1.6	5.3	02.5	PP2
2 x 16	LM2162	84	76	4	71.5	55.2	60	2.4	7.2	30	24	3	26.2	7.8	12	12.2	16	8	9.0	1.6	4	02.5	PP2
2 x 20	LM69	116	108	4	95	73.5	83	4.75	16.5	37	29	4.0	36	6.9	11.5	12.8	18.6	9.2	13	1.6	4.7	03.5	PP2
2 x 20	LM2215	116	108	4	91.8	75.4	82.8	3.7	12.6	44.2	29	9.0	35.2	NA	11.5	17.75	18.5	14.25	11	1.6	5.7	03.5	PP3
2 x 24	LM23	118	113	2.5	108.5	89.4	93.5	2.05	15	36	31	2.5	28.5	7.88	12.3	11.85	15.8	10.1	13.0	1.6	4.7	02.5	PP2
2 x 24	LM2227	118	113	2.5	102	88.3	93.5	2.5	14	36	31	2.5	28.5	7.8	11.5	12.5	15.8	10	11	1.6	5.7	02.5	PP2
2 x 40	LM24	182	175	3.5	164.5	149.9	154.5	2.85	16.30	33.5	26.5	3.5	32.5	7.0	12.3	10.60	15.8	8.5	13.0	1.6	4.7	03.5	PP2
2 x 40	LM2218	182	175	3.5	161.4	147.5	152.2	2.35	17.4	33.6	26.5	3.55	32.4	7.09	11.5	16.5	8.55	14.3	12.0	1.6	9.0	03.5	PP2
2 x 40	LM2402	149.4	144.4	2.5	138.4	126.3	130.8	2.25	5.5	27	20	2.5	23.5	NA	9.6	NA	13.2	6.9	14.6	1.6	9	02.5	PP1
4 x 16	LM73	87	82	2.5	85	56.2	61.3	2.8	13.6	60	55	2.5	42	NA	20.8	19.6	25.2	17.4	14.0	1.6	4.7	02.5	PP1
4 x 16	LM2433	87	82	2.5	81.5	56.2	61.8	2.8	12.35	60	55	2.5	3.95	NA	20.8	19.6	25.2	17.4	11	1.6	5.4	02.5	PP1
4 x 20	LM2043	77	70	3.5	75.4	55	58.6	1.8	9.2	47	40	3.5	32.3	NA	17.5	14.75	21.1	12.95	11.5	1.2	6	03.0	PP1
4 x 20	LM2434	99	93	2.9	97.7	70.4	76	2.8	10.85	60.2	55	2.6	39.6	NA	20.8	19.7	25.2	17.35	11	1.6	5.7	02.8	PP1
4 x 40	LM44	215	207	4	197	149.45	160	5.28	39.5	60	52	4	58	7.5	27.25	16.38	34	13	17.5	2	7.6	03.2	PP5
4 x 40	LM2457	190	183	3.5	166.8	140.45	147	3.275	21.5	54	47	3.5	43	4.6	23.16	15.42	29.5	12.25	11	1.6	5.7	03.5	PP4

NOTE

Module numbers are shown in their abbreviated form.

Full module number is typically LM24 x 2C40 xxx.

Please see ordering information for full explanation.

Full detailed specifications are available. Please contact your local sales office if you require this information.

Refer to page 8 for full details of pin positions*.

LCD MODULES WITH LED BACKLIGHTS

Display Format	Module Number	Character Height (mm)	High Contrast Option	Duty Cycle	LED Current mA TYP	Effective Viewing Area W x H (mm)	Overall Size W x H x D (mm)
1 x 8	LM465	4.51	STN	1/8	72	35.0 x 15.0	58.0 x 32.0 x 14.0
1 x 16	LM412	5.60	STN	1/11	168	63.5 x 15.8	85.0 x 36.0 x 14.0
1 x 16	LM431 ★	12.71	STN	1/8	200	120.0 x 23.0	151.0 x 40.0 x 14.6
1 x 16	● LM4 15	5.20	NTN	1/8	40	64.5 x 13.8	80.0 x 36.0 x 12.0
1 x 16	● LM4020	5.20	NTN	1/16	40	64.5 x 13.8	80.0 x 36.0 x 12.5
1 x 16	LM4828	8.06	NTN	1/16	190	99.0 x 13.0	122.2 x 33.5 x 14.0
1 x 20	LM432 ★	12.71	STN	1/8	250	149.0 x 23.0	180.0 x 40.0 x 14.6
1 x 24	LM413	5.55	STN	1/11	200	93.5 x 15.8	118.0 x 36.0 x 14.0
1 x 24	LM433 ★	12.71	STN	1/8	300	178.0 x 23.0	208.0 x 40.0 x 14.0
1 x 40	LM414	5.55	STN	1/11	180	154.5 x 15.8	182.0 x 33.5 x 16.0
2 x 8	LM470	3.80	STN	1/16	72	35.0 x 15.0	58.0 x 32.0 x 14.0
2 x 12	● LM4212	4.95	NTN	1/16	27	44.5 x 15.5	55.7 x 32.0 x 12.0
2 x 16	LM422	4.45	STN	1/16	168	63.5 x 15.8	85.0 x 36.0 x 14.0
2 x 16	LM434 ★	8.44	STN	1/16	200	120.0 x 23.0	151.0 x 40.0 x 14.6
2 x 16	● LM4000	3.2	NTN	1/16	40	64.5 x 13.8	80.0 x 36.0 x 14.5
2 x 16	● LM4016	4.85	NTN	1/16	40	61.0 x 16.0	84.0 x 44.0 x 11.0
2 x 16	● LM4022	4.80	NTN	1/16	40	63.5 x 15.8	85.0 x 36.0 x 12.0
2 x 16	● LM4162	4.27	NTN	1/16	40	62.0 x 16.0	85.0 x 30.0 x 12.0
2 x 16	● LM4216	4.80	NTN	1/16	120	61.0 x 16.0	84.0 x 44.0 x 14.3
2 x 16	● LM4222	4.80	NTN	1/16	120	62.0 x 16.0	85.0 x 36.0 x 13.9
2 x 16	LM4830	8.06	NTN	1/16	380	99.0 x 24.0	122.0 x 44.0 x 14.3
2 x 20	LM435 ★	8.44	STN	1/16	250	162.0 x 23.0	180.0 x 40.0 x 14.6
2 x 20	LM469	5.55	STN	1/16	168	83.0 x 18.6	116.0 x 37.0 x 16.0
2 x 20	LM4261	4.85	NTN	1/16	130	85.0 x 18.5	116.0 x 37.0 x 15.5
2 x 24	LM423	4.51	STN	1/16	189	93.5 x 15.8	118.0 x 36.0 x 14.0
2 x 24	LM4227	4.80	NTN	1/16	180	93.5 x 15.8	118.0 x 36.0 x 14.9
2 x 24	LM436 ★	8.44	STN	1/16	400	178.0 x 23.0	208.0 x 40.0 x 14.6
2 x 40	LM424	4.51	STN	1/16	180	154.5 x 15.8	182.0 x 33.5 x 16.0
2 x 40	LM4218	4.80	NTN	1/16	600	152.2 x 16.5	182.0 x 33.6 x 14.3
2 x 40	LM4402	4.01	NTN	1/16	600	130.8 x 13.2	149.4 x 27.0 x 14.6
4 x 16	LM4416	4.15	NTN	1/16	480	61.8 x 25.2	87.0 x 60.0 x 14.3
4 x 16	● LM4433	4.15	NTN	1/16	80	61.8 x 25.2	87.0 x 60.0 x 12.5
4 x 20	LM4043	3.51	NTN	1/16	440	58.6 x 21.1	77.0 x 47.0 x 16.0
4 x 20	LM4821	4.15	NTN	1/16	300	76.0 x 25.25	98.8 x 60.2 x 14.0
4 x 20	● LM4434	4.15	NTN	1/16	80	76.0 x 25.25	98.8 x 60.2 x 12.5
4 x 40	LM4857	4.27	NTN	1/16	360	147.0 x 29.5	190.0 x 54.0 x 14.9

FLUID OPTIONS

All modules available in TN with high contrast options as shown.

TEMPERATURE

Standard range TN and NTN 0°C to + 50°C

Standard range STN 0°C to + 40°C

Extended range STN - 20°C to + 60°C ★

Extended range NTN available on selected LM4000 Series modules.

Contact local sales office for details.

BACKLIGHT OPTIONS

Modules marked with ● have low current Edgelit-backlight, all others have surface array type for even illumination.

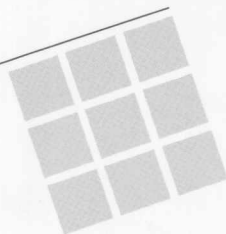
POLARISER TYPES

B - Transflective

LED backlight fitted. Suitable for use in both high and low ambient light conditions with LED activated. Display has Black dot on light background.

E - Transmissive

LED backlight fitted. Suitable for office and low ambient light conditions, lit dot on a dark background.



MECHANICAL DIMENSIONS

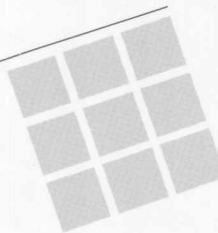
Display Format	Module Number	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	Pin Pos ★
1 x 8	LM465	58	53	2.5	45	26.86	35	4.1	11.5	32	27	2.5	28.6	8.38	5.81	13.5	15	8.5	14	1.6	8.4	Ø2.5	PP2
1 x 16	LM412	85	80	2.5	73.5	59.4	63.5	2.05	13.25	36	31	2.5	28.5	7.88	8.7	13.65	15.8	10.1	14	1.6	8.4	Ø2.5	PP2
1 x 16	LM431	151	143	4	133	116.4	120	1.8	15.5	40	32	4	37	8.38	14.54	12.73	23	8.5	14.6	1.6	10	Ø3.5	PP2
1 x 16	LM4015	80	75	2.5	71.5	59.45	64.5	25.25	7.75	36	31	2.5	27	8	5.24	10.38	13.8	11.1	12	1.6	7	Ø2.5	PP1
1 x 16	LM4020	80	75	2.5	71.5	59.4	64.5	2.55	7.75	36	31	2.5	27	8	5.08	15.46	13.8	11.1	12.5	1.6	7.1	Ø2.5	PP1
1 x 16	LM4828	1222	115	3.6	106.2	90	99	4.5	11.6	33.2	25	4.1	23.6	12.48	7.67	12.76	13	10.1	14	1.6	9.3	Ø3.5	PP1
1 x 20	LM432	180	172	4	162	145.2	149	1.9	15.5	40	32	4	37	8.38	14.54	12.73	23	8.5	14.6	1.6	4.6	Ø3.5	PP2
1 x 24	LM413	118	113	2.5	108.5	89.5	93.5	2.05	15	36	31	2.5	28.5	7.88	8.7	13.65	15.8	10.1	14	1.6	9.3	Ø2.5	PP2
1 x 24	LM433	208	200	4	190	174	178	2	15	40	32	4	37	8.38	14.54	12.73	23	8.5	14.6	1.6	4.6	Ø3.5	PP2
1 x 40	LM414	182	175	3.5	164.5	149.4	154.5	2.55	13.75	33.5	26.5	3.5	32.5	7.0	8.7	13.25	15.8	8.5	15.5	1.6	12.2	Ø3.5	PP2
2 x 8	LM470	58	53	2.5	45	25.2	35	4.9	11.5	32	27	2.5	28.6	5.88	9.6	11.2	15	8.5	14	1.6	8.4	Ø2.5	PP2
2 x 12	LM4212	55.7	31.2	12.25	52.3	45.2	46.7	0.75	4.5	32.0	30.0	-	25.0	-	11.7	-	17.5	7.25	12	1.6	5.5	-	PP7
2 x 16	LM422	85	80	2.5	73.5	59.4	63.5	2.05	13.25	36	31	2.5	28.5	7.88	12.3	11.85	15.8	10.1	14	1.6	8.4	Ø2.5	PP2
2 x 16	LM434	151	143	4	133	116.4	120	1.8	15.5	40	32	4	37	8.38	20.6	9.68	23	8.5	14.6	1.6	4.7	Ø3.5	PP2
2 x 16	LM4000	80	75	2.5	71.5	57.7	64.5	3.4	9.3	36	31	2.5	27	-	9.4	11.4	13.8	8.9	11	1.6	4.6	Ø2.5	PP1
2 x 16	LM4016	84	76	4	71.5	56.2	61	2.4	11.5	44	36	4.0	34.5	4	11.5	16.25	16	12.5	12	1.6	6.4	Ø2.5	PP2
2 x 16	LM4022	85	80	2.5	71.5	56.2	63.5	3.65	13.25	36	31	2.5	31.5	7.88	11.5	12.25	15.8	10.1	12	1.6	6.4	Ø2.5	PP2
2 x 16	LM4162	85	82	1.5	70.5	56.2	62	3	7.2	30	24	3	26.2	7.8	12	12.2	16	8	14.3	1.6	4.6	Ø2.5	PP2
2 x 16	LM4216	84	76	4	71.5	55.2	60.0	2.4	11.5	44	36	4	33.7	-	11.5	14	16	12.5	14.3	1.6	9.5	Ø2.5	PP3
2 x 16	LM4222	85	80	2.5	71.5	56.2	62	2.9	14	36	31	2.5	31.5	7.8	11.5	12.2	16	10	13.9	1.6	8.6	Ø1.0	PP2
2 x 16	LM4830	122	115	3.5	106	94.84	99	2.08	11.5	44	37	3.5	35.4	7.48	20	12	24	10	14.3	1.6	9.0	Ø3.5	PP3
2 x 20	LM435	180	172	4	162	145.2	149	1.9	15.5	40	32	4	37	8.38	20.64	9.68	23	8.5	14.8	1.6	4.7	Ø3.5	PP2
2 x 20	LM469	116	108	4	95	73.5	83	4.75	16.5	37	29	4	36	6.9	11.5	12.8	18.6	9.2	16	1.6	10.4	Ø3.5	PP2
2 x 20	LM4261	116	108	4	93.25	73.5	83	5.6	16.6	37	28	4	31.5	6.9	11.5	12.8	15	9	15.4	1.6	10	Ø3.5	PP2
2 x 24	LM423	118	113	2.5	108.5	89.4	93.5	2.05	15.0	36	31	2.5	28.5	7.88	12.3	11.85	15.8	10.1	13	1.6	4.7	Ø2.5	PP2
2 x 24	LM4227	118	113	2.5	107	88.3	93.5	2.6	12.25	36	31	2.5	28.5	7.88	11.5	12.25	15.8	10.1	15	1.6	9.3	Ø2.5	PP2
2 x 24	LM436	208	200	4	190	174	178	2	15	40	32	4	37	8.38	20.64	9.68	23	8.5	14.6	1.6	4.7	Ø3.5	PP2
2 x 40	LM424	182	175	3.5	164.5	149.4	154.5	2.55	13.75	33.5	26.5	3.5	32.5	7.0	12.3	10.60	15.8	8.4	15.5	1.6	12.2	Ø3.5	PP2
2 x 40	LM4218	182	175	3.5	161.4	147.5	152.2	2.35	17.4	33.6	26.5	3.5	32.4	7.09	11.5	16.5	8.5	14.3	14.6	1.6	9.0	Ø3.5	PP2
2 x 40	LM4402	149.4	144.4	2.5	138.4	126.3	130.8	2.25	5.5	27	20	2.5	23.5	-	9.6	-	13.2	6.9	14.6	1.6	9.0	Ø2.5	PP1
4 x 16	LM4416	87	82	2.5	81.5	56.2	61.8	2.8	12.6	60	55	2.5	39.5	7.5	20.8	19.6	25.2	17.4	14.3	1.6	9.0	Ø2.5	PP1
4 x 16	LM4433	87	82	2.5	81.5	56.2	61.8	2.8	12.6	60	55	2.5	39.5	7.5	20.8	19.6	25.2	17.4	12.5	1.6	7.1	Ø2.5	PP1
4 x 20	LM4043	77	70	3.5	75.4	55	58.6	1.8	9.2	47	40	3.5	32.3	4.5	17.5	14.75	21.1	12.95	16	1.6	11	Ø3.0	PP1
4 x 20	LM4821	98.8	76	11.4	97.7	70.4	76	2.8	11.4	60.2	55	2.6	39.6	7.5	20.6	39.1	25.5	36.65	14.3	1.6	9.0	Ø2.8	PP1
4 x 20	LM4434	98.8	93	2.9	97.7	70.4	76	2.8	11.4	60.2	55	2.6	39.6	7.5	20.8	19.7	25.2	17.35	12.5	1.6	7.2	Ø2.8	PP1
4 x 40	LM4857	190	183	3.5	165.8	140.45	147	3.275	21.5	54	47	3.5	43	14.61	23.16	15.42	29.5	12.25	15	1.6	9.0	Ø2.5	PP4

NOTE

Module numbers are shown in their abbreviated form.
Full module number is typically LM24 x 2C40 xxx.
Please see ordering information for full explanation.

Full detailed specifications are available. Please contact
your local sales office if you require this information.

Refer to page 8 for full details of pin positions*.



LARGE CHARACTER LCD MODULES

Display Format	Module Number	Character Height (mm)	High Contrast Option	Duty Cycle	Backlight Option	Effective Viewing Area W x H (mm)	Overall Size W x H x D (mm)
1 x 16	LM301 ★	12.71	STN	1/8	EL	120.0 x 23.0	151.0 x 40.0 x 9.3
1 x 16	LM431 ●	12.71	STN	1/8	LED	120.0 x 23.0	151.0 x 40.0 x 9.3
1 x 16	LM2128 ●	8.06	NTN	1/16	EL	99.0 x 13.0	122.2 x 33.2 x 11.0
1 x 16	LM4128 ●	8.06	NTN	1/16	LED	99.0 x 13.0	122.2 x 33.2 x 14.0
1 x 20	LM302 ★	12.71	STN	1/8	EL	149.0 x 23.0	180.0 x 40.0 x 9.3
1 x 20	LM432 ●	12.71	STN	1/8	LED	149.0 x 23.0	180.0 x 40.0 x 14.6
1 x 24	LM303 ★	12.71	STN	1/8	EL	178.0 x 23.0	208.0 x 40.0 x 9.3
1 x 24	LM433 ●	12.71	STN	1/8	LED	178.0 x 23.0	208.0 x 40.0 x 14.6
1 x 40	LM760	12.69	STN	1/8	EL	245.0 x 20.0	285.0 x 40.0 x 12.0
2 x 16	LM304 ★	8.44	STN	1/16	EL	120.0 x 23.0	151.0 x 40.0 x 9.3
2 x 16	LM434 ●	8.44	STN	1/16	LED	120.0 x 23.0	151.0 x 40.0 x 14.6
2 x 16	LM2230 ●	8.06	NTN	1/16	EL	99.0 x 24.0	122.0 x 44.0 x 12.0
2 x 16	LM4230 ●	8.06	NTN	1/16	LED	99.0 x 24.0	122.0 x 44.0 x 14.3
2 x 20	LM305 ★	8.44	STN	1/16	EL	162.0 x 23.0	180.0 x 40.0 x 9.3
2 x 20	LM435 ●	8.44	STN	1/16	LED	162.0 x 23.0	180.0 x 40.0 x 14.6
2 x 24	LM306 ★	8.44	STN	1/16	EL	178.0 x 23.0	208.0 x 40.0 x 9.3
2 x 24	LM436 ●	8.44	STN	1/16	LED	178.0 x 23.0	208.0 x 40.0 x 14.6
2 x 40	LM780	12.69	STN	1/16	EL	245.0 x 20.0	285.0 x 56.0 x 12.0
4 x 40	LM790	12.69	STN	1/16	EL	244.0 x 68.0	280.0 x 88.0 x 13.0

FLUID OPTIONS

All modules available in TN with high contrast options as shown.

TEMPERATURE

Standard range TN, STN, NTN 0°C to + 50°C
 Extended range STN marked ★ -20°C to + 70°C
 Extended range STN, NTN marked ● -20°C to + 60°C } Extended temp range is optional.
 Please see order information for correct part number.

POLARISER TYPES

A - Reflective

No backlight fitted. Suitable for use in high ambient light conditions.

B - Transflective

LED/EL backlight fitted. Suitable for use in both high and low ambient light conditions with LED/EL lamp activated. Display has black dot on light background.

E - Transmissive

LED/EL backlight fitted. Suitable for office and low ambient light conditions, lit dot on a dark background.

MECHANICAL DIMENSIONS

Display Format	Module Number	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	Pin Pos ★
1 x 16	LM301	151	143	4	133	116.4	120	1.8	16.5	40	32	4	37	8.38	14.54	12.73	23	8.5	9.3	1.6	4.7	Ø3.5	PP2
1 x 16	LM431	151	143	4	133	116.4	120	1.8	16.5	40	32	4	37	8.38	14.54	12.73	23	8.5	14.6	1.6	10	Ø3.5	PP2
1 x 16	LM2128	122.2	115	3.6	106.2	90	99	4.5	11.6	33.2	25	4.1	23.6	12.48	9.66	11.77	13	10.1	11	1.6	5.7	Ø3.5	PP1
1 x 16	LM4128	122.2	115	3.6	106.2	90	99	4.5	11.6	33.2	25	4.1	23.6	12.48	9.66	11.77	13	10.1	14	1.6	9.3	Ø3.5	PP1
1 x 20	LM302	180	172	4	162	145.2	149	1.9	16.5	40	32	4	37	8.38	14.54	12.73	23	8.5	9.3	1.6	4.7	Ø3.5	PP2
1 x 20	LM432	180	172	4	162	145.2	149	1.9	16.5	40	32	4	37	8.38	14.54	12.73	23	8.5	14.6	1.6	10	Ø3.5	PP2
1 x 24	LM303	208	200	4	190	174	178	2	16.5	40	32	4	37	8.38	14.54	12.73	23	8.5	9.3	1.6	4.7	Ø3.5	PP2
1 x 24	LM433	208	200	4	190	174	178	2	16.5	40	32	4	37	8.38	14.54	12.73	23	8.5	14.6	1.6	10	Ø3.5	PP2
1 x 40	LM760	285	277	4	264	239.2	245	3.4	22.5	40	33.5	4	33.5	8.38	14.51	12.75	20	10	12	1.6	4.7	Ø3.5	PP2
2 x 16	LM304	151	143	4	133	116.4	120	1.8	16.5	40	32	4	37	8.38	20.64	9.68	23	8.5	9.3	1.6	4.7	Ø3.5	PP2
2 x 16	LM434	151	143	4	133	116.4	120	1.8	16.5	40	32	4	37	8.38	20.64	9.68	23	8.5	14.6	1.6	10	Ø3.5	PP2
2 x 16	LM2230	122	115	3.5	106	90	99	4.5	11.5	44	37	3.5	35.4	7.48	20.00	10.3	24	8.3	11	1.6	5.7	Ø3.5	PP3
2 x 16	LM4230	122	115	3.5	106	90	99	4.5	11.5	44	37	3.5	35.4	7.48	20.00	10.3	24	8.3	14.3	1.6	9.0	Ø3.5	PP3
2 x 20	LM305	180	172	4	162	145.2	149	1.9	16.5	40	32	4	37	8.38	20.64	9.68	23	8.5	9.3	1.6	4.7	Ø3.5	PP2
2 x 20	LM435	180	172	4	162	145.2	149	1.9	16.5	40	32	4	37	8.38	20.64	9.68	23	8.5	14.6	1.6	10	Ø3.5	PP2
2 x 24	LM306	208	200	4	190	174	178	2	15	40	32	4	37	8.38	20.64	9.68	23	8.5	9.3	1.6	4.7	Ø3.2	PP2
2 x 24	LM436	208	200	4	190	174	178	2	15	40	32	4	37	8.38	20.64	9.68	23	8.5	14.6	1.6	10	Ø3.5	PP2
2 x 40	LM780	285	277	4	264	239.2	245	3.4	22.5	56	48	4	51.5	16.38	30.89	12.555	38	9	12	1.6	4.7	Ø3.5	PP2
4 x 40	LM790	280	272	4	264	239.2	244	2.4	18	88	80	4	85	22.22	63.65	12.175	68	10	13	1.6	5.0	Ø3.2	PP8

NOTE

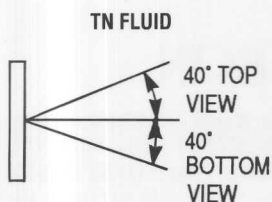
Module numbers are shown in their abbreviated form. Full module number is typically LM24 x 2C40 xxx.
Please see ordering information for full explanation.

Full detailed specifications are available. Please contact your local sales office if you require this information.

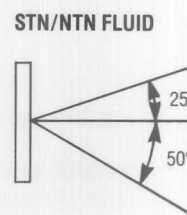
Refer to page 8 for full details of pin position*.

FLUID DEFINITIONS

TN Definition: TN modules contain LCD fluid which is twisted to about 90°. TN modules offer a typical viewing angle of 40° either Top or Bottom and a typical contrast ratio of 4:1.
TN modules with wide viewing fluid option "W" offer a typical viewing angle of 50° TOP or Bottom at a typical contrast ratio of 4:1.

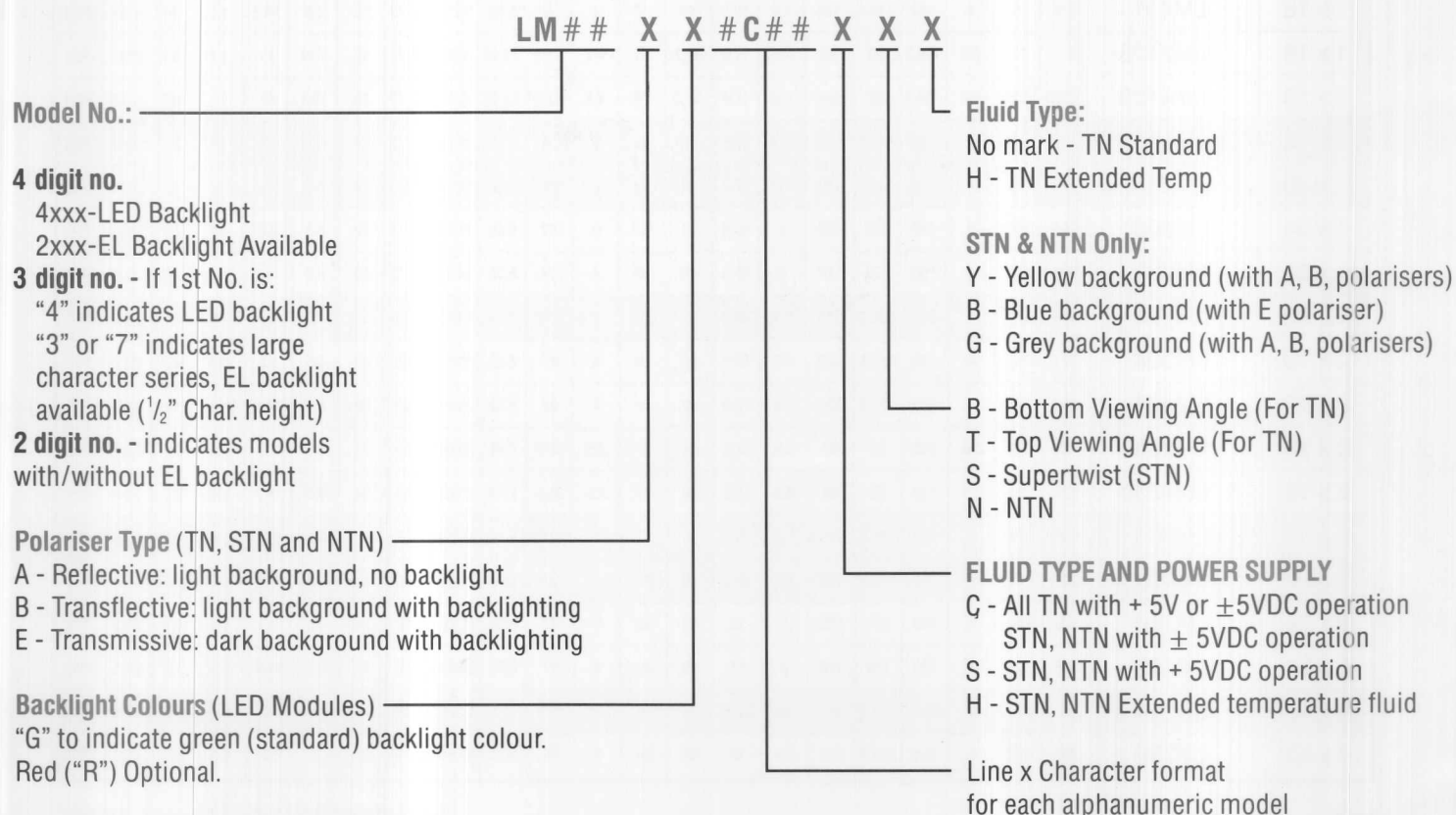


STN/NTN Definition: STN/NTN modules contain LCD fluid which is highly twisted (greater than 200°). STN/NTN modules offer a typical viewing angle of 75° and a typical contrast ratio of 10:1. The viewing cone for STN/NTN modules is as shown here.



ORDERING INFORMATION

Densitron features a "build-a-part-number" system to identify its liquid crystal display (LCD) modules. Obtain the Model No. based on the desired format and character size. Polariser type determines overall look and viewability in various ambient lighting conditions. Fluid type and viewing angle are determined by environmental and ergonomic considerations. An explanation of the part number breakdown is given below:



Important notice to Purchaser

All statements, technical information and recommendations herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed, and the following is made in lieu of all warranties, expressed or implied, including the implied warranties of merchantability and fitness for purpose: Seller's and manufacturers only obligation shall be to replace such quantity of the product proved to be defective.

Before using, user shall determine the suitability of the product for its intended use, and user assumes all risk and liability whatsoever in connection therewith. Neither seller nor manufacturer shall be liable either in tort or in contract for any loss or damage, direct, incidental, or consequential, arising out of the use of or the inability to use the product. No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.

DENSITRON

DENSITRON EUROPE LIMITED, Unit 4, Airport Trading Estate, Biggin Hill, Westerham, Kent TN16 3BW, England
 Phone: (0959) 571011/576600 Facsimile: (0959) 571017 Telex: 957353

DENSITRON FRANCE, 5 Rue Montespan, 91024 Evry Cedex, France. Phone: (1) 60 774848 Facsimile: (1) 60 775809

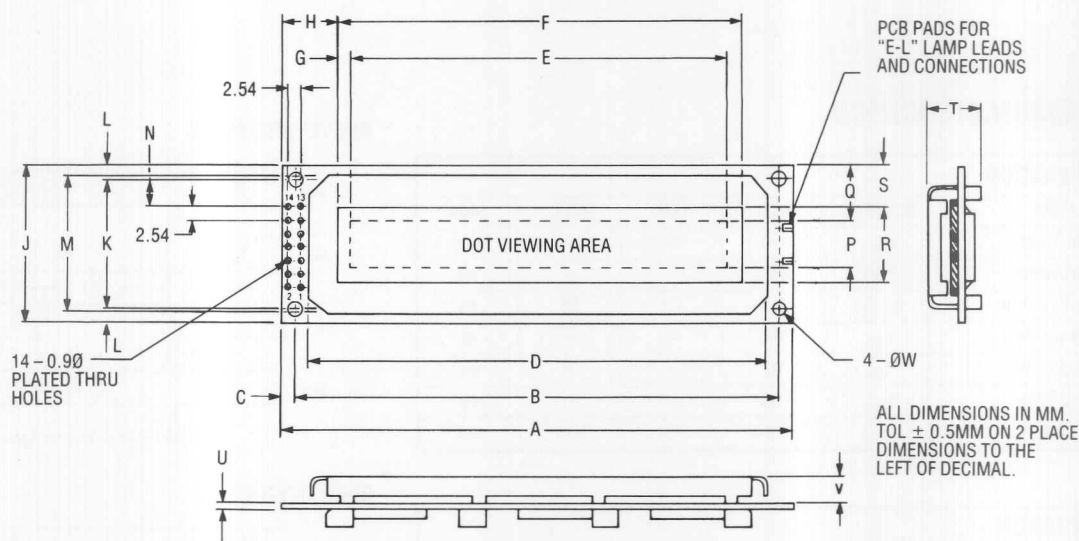
DENSITRON ITALIA, Piazza Carbonari 12, 20125 Milano, Italy. Phone: (02) 66710822 Facsimile: (02) 66710695

DENSITRON GMBH, Dompfaffweg 10, 8000 Munchen 82, Germany. Phone: (89) 430-1050 Facsimile: (89) 439-1884

DENSITRON CORPORATION WESTERN REGION, 3425 West Lomita Boulevard, Torrance, CA 90505 U.S.A.
 Phone: (310) 530-3530 Facsimile: (310) 534-8419 (G2/G3) Telex: (11) 910-349 6200 DENSITRON TRNC

DENSITRON CORPORATION EASTERN REGION, Camden Business Centre, 2039 Hwy 1, Camden, SC 29020 U.S.A.
 Phone: (803) 432 5008 Facsimile: (803) 432 1165

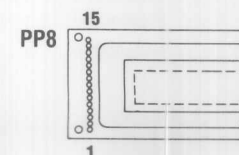
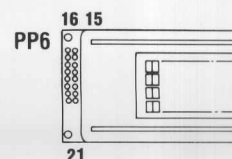
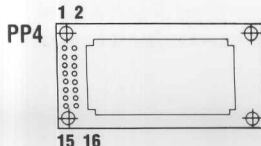
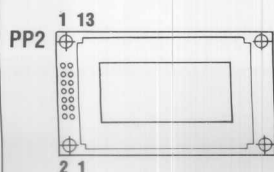
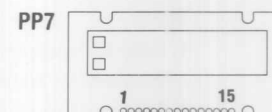
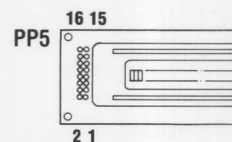
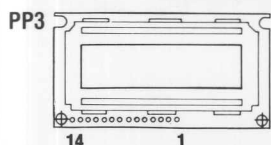
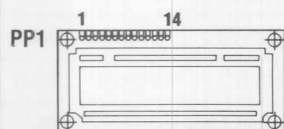
MECHANICAL DIMENSIONS & PIN POSITIONING



PIN CONNECTIONS

Signal	Drawing Number						Signal	Level	Function
	PP8	PP7	PP6	PP5	PP4	PP1, 2, 3			
VSS	1	1	1	15	13	1	VSS	GROUND	GROUND = 0V
VDD	2	2	2	14	14	2	VDD	5V	LOGIC SUPPLY = +5V
V ₀	3	3	3	13	12	3	V ₀		POWER SUPPLY FOR LC DRIVING
RS	4	4	4	11	11	4	RS	L INST. H CHAR	SELECT REGISTERS
RW	5	5	5	12	10	5	RW	L W H R	SELECT WRITE/READ
E ₁	6	6	6	9	9	6	E ₁	LATCH FALL	START PULSE
DB ₀	7	7	7	7	8	7	DB ₀	H L	LOWER ORDER 4-BIT DATA BUS FOR DATA TRANSFER
DB ₁	8	8	8	8	7	8	DB ₁	H L	
DB ₂	9	9	9	5	6	9	DB ₂	H L	
DB ₃	10	10	10	6	5	10	DB ₃	H L	
DB ₄	11	11	11	3	4	11	DB ₄	H L	UPPER ORDER 4-BIT DATA BUS FOR DATA TRANSFER
DB ₅	12	12	12	4	3	12	DB ₅	H L	
DB ₆	13	13	13	1	2	13	DB ₆	H L	
DB ₇	14	14	14	2	1	14	DB ₇	H L	
E ₂	15	15*	16	10	15	—	E ₂	LATCHFALL	START PULSE
NC	—	—	—	—	16	—	NC	—	—

• PIN15 V_{LED+}



TIMING CHARACTERISTICS AND POWER SUPPLY REQUIREMENTS

TIMING CHARACTERISTICS

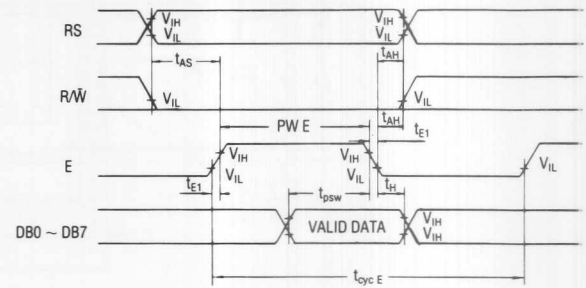
WRITE OPERATION

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
Enable Cycle Time	$t_{cyc E}$	1.0	—	—	μs
Enable Pulse Width	PW E	450	—	—	ns
Enable Rise/Fall Time	t_{Er}, t_{Ef}	—	—	25	ns
Address Set-up Time	t_{AS}	140	—	—	ns
Address Hold Time	t_{AH}	10	—	—	ns
Data Start-up Time	t_{DSW}	195	—	—	ns
Data Hold Time	t_H	10	—	—	ns

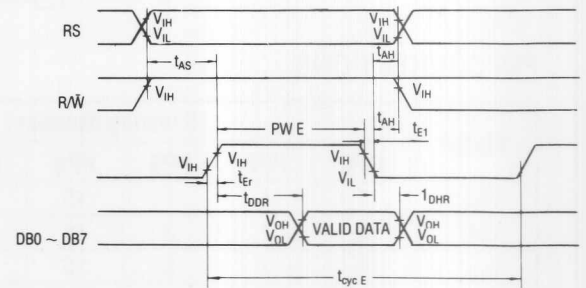
READ OPERATION

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
Enable Cycle Time	$t_{cyc E}$	1.0	—	—	μs
Enable Pulse Width	PW E	450	—	—	ns
Enable Rise/Fall Time	t_{Er}, t_{Ef}	—	—	25	ns
Address Set-up Time	t_{AS}	140	—	—	ns
Address Hold Time	t_{AH}	10	—	—	ns
Data Delay Time	t_{DDR}	—	—	320	ns
Data Hold Time	t_{DHR}	20	—	—	ns

WRITE OPERATION

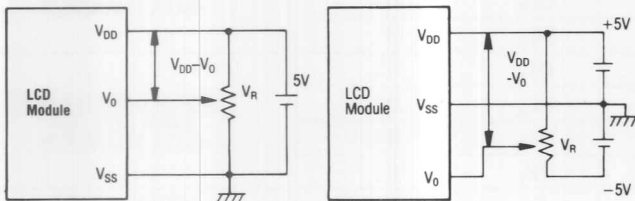


READ OPERATION



POWER SUPPLY REQUIREMENTS

DISPLAY



V_R 10K Ω - 20K Ω

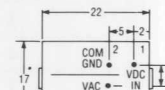
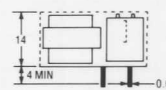
Single Voltage Operation

Dual Voltage Operation

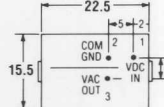
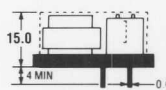
NOTE:

1. Refer to Densitron Alphanumeric Application Notes for additional technical information.
2. The Densitron SA series of RS232 controller cards is available for selected modules.
Please contact your local sales offices for further information.

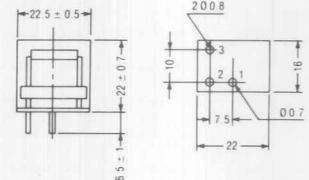
INVERTER DAS 5V4



DAS 5V4-P



DAS 5V7



INVERTER	V_{OUT}	I_{IN} MA
DAS5V4	70 Vrms	25.0
DAS5V4-P	70 Vrms	27.0
DAS5V7	85 Vrms	100.0

Supply voltage all models + 5V

DASV4/DASV4-P RECOMMENDED FOR ALL "B" POLARISER MODELS.
EXCEPT LM44 AND ALL LARGE CHARACTER MODULES WHERE DAS5V7 IS SUITABLE.